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EXAMINER

CLEARY, THOMAS J

ART UNIT	PAPER NUMBER
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2111

DATE MAILED: 10/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/028,161

Applicant(s)

THORSBAKKEN ET AL.

Examiner

Thomas J. Cleary

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-14,17-34 and 36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-14,17-34 and 36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of Claims 4-5, 11-14, 17-34, and 36 is withdrawn in view of the newly discovered reference(s) to Ramanujan, Borland, and Kavi.

Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the Applicant regards as his invention.

3. Claims 1-2, 4-14, 17-26, and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. It is unclear if ownership is granted to all of the plurality of agents or if ownership is granted to one of the plurality of agents at a time.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the Applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 27, 28, 29, 30, 31, 32, 33, and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent Number 5,341,491 to Ramanujan ("Ramanujan").

6. In reference to Claim 1, Ramanujan discloses allocating ownership of a bus (See Figure 1 Numbers 33 and 35) to a plurality of agents (See Figure 1 Numbers 11-14) based on a predetermined bus arbitration order (See Column 1 Lines 18-38); queuing agent identifiers of the agents that issued commands which were retried due to unavailable processing resources (See Column 1 Lines 43-47 and Column 2 Lines 33-37 and 49-55); and granting command processing priority of the processing resources to agents corresponding to the queued agent identifiers relative to other agents having ownership of the bus in an order in which the queued agent identifiers were queued relative to each other (See Column 2 Lines 19-24 and 49-55).

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7. In reference to Claim 2, Ramanujan discloses the limitations as applied to Claim 1 above. Ramanujan further discloses issuing retry responses for commands issued by the other agents to avail the processing resources to the agents corresponding to the queued agent identifiers (See Column 1 Lines 43-47 and Column 2 Lines 49-55).

8. In reference to Claim 4, Ramanujan discloses the limitations as applied to Claim 1 above. Ramanujan further discloses that queuing agent identifiers comprises queuing the agent identifiers in a first-in, first-out fashion (See Column 2 Lines 19-24 and 49-55).

9. In reference to Claim 5, Ramanujan discloses the limitations as applied to Claim 4 above. Ramanujan further discloses that granting command processing priority of the processing resources comprises granting command processing priority to the agents corresponding to the queued agent identifiers in the first-in, first-out fashion (See Column 2 Lines 19-24 and 49-55).

10. In reference to Claim 6, Ramanujan discloses the limitations as applied to Claim 1 above. Ramanujan further discloses that granting command processing priority of the processing resources comprises always granting command processing priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus. (See Column 2 Lines 49-55).

11. In reference to Claim 7, Ramanujan discloses the limitations as applied to Claim 1 above. Ramanujan further discloses that granting command processing priority of the processing resources comprises granting command processing priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus in accordance with a predefined fairness algorithm (See Column 2 Lines 33-48).

12. In reference to Claim 8, Ramanujan discloses the limitations as applied to Claim 1 above. Ramanujan further discloses regulating the command processing priority between the agents corresponding to the queued agent identifiers and the other agents having ownership of the bus (See Column 2 Lines 49-55).

13. In reference to Claim 9, Ramanujan discloses the limitations as applied to Claim 8 above. Ramanujan further discloses selectively granting command processing priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus (See Column 2 Lines 33-55).

14. In reference to Claim 11, Ramanujan discloses the limitations as applied to Claim 1 above. Ramanujan further discloses imposing queue entry rules on the agent identifiers of the agents that issued commands which were retried, and wherein queuing the agent identifiers comprises queuing only those agent identifiers complying with the queue entry rules (See Column 2 Lines 24-68).

15. In reference to Claim 12, Ramanujan discloses the limitations as applied to Claim 11 above. Ramanujan further discloses that imposing queue entry rules comprises prohibiting queuing the agent identifiers associated with commands that were retried if the agent identifier has already been queued (See Column 2 Lines 24-32).

16. In reference to Claim 13, Ramanujan discloses the limitations as applied to Claim 11 above. Ramanujan further discloses that imposing queue entry rules comprises prohibiting queuing the agent identifiers associated with commands that were retried if the processing resources are currently processing a command for the corresponding agent (See Column 2 Lines 24-32 and Column 10 Lines 33-38).

17. In reference to Claim 27, Ramanujan discloses (a) an established-order arbiter for allocating bus ownership (See Column 1 Lines 18-38) among a plurality of bus agents (See Figure 1 Numbers 11-14); (b) a processing fairness module, comprising: (i) a queue to store bus agent identifiers (IDs) corresponding to bus agents that issued commands which were subjected to a retry due to unavailable processing resources (See Column 1 Lines 43-47 and Column 2 Lines 33-37 and 49-55); (ii) a dynamically configurable queue output throttle to adjust an availability of a valid bus agent ID at an output of the queue (See Column 2 Lines 33-48); (c) an override module coupled to the established-order arbiter and the processing fairness module to grant command

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processing priority of the processing resources to either the bus agents corresponding to valid bus agent IDs or to the bus agents that have been granted bus ownership, depending on whether the valid bus agent ID at the output of the queue is available as determined by the queue output throttle (See Column 2 Lines 49-68).

18. In reference to Claim 28, Ramanujan discloses the limitations as applied to Claim 27 above. Ramanujan further discloses a maximum starvation register to store a predetermined number of valid bus agent IDs that will be passed over for processing (See Column 7 Lines 59-61); a current starvation register to store a current number of valid bus agent IDs that have been passed over for processing (See Column 2 Lines 33-48 and Column 7 Lines 51-59) and a compare module coupled to the maximum starvation register and the current starvation register to compare the current and predetermined numbers of valid bus agent IDs that have been passed over for processing, and to output an availability indicator to indicate the availability of the valid bus agent ID (See Column 7 Lines 57-59).

19. In reference to Claim 29, Ramanujan discloses the limitations as applied to Claim 28 above. Ramanujan further discloses an incrementing module coupled to the current starvation register to increment the current starvation register each time that the valid bus agent ID has been passed over for processing (See Column 7 Lines 55-57).

20. In reference to Claim 30, Ramanujan discloses the limitations as applied to Claim 29 above. Ramanujan further discloses a reset module coupled to the current starvation register to reset the current starvation register upon the output of the availability indicator (See Column 7 Lines 55-63).

21. In reference to Claim 31, Ramanujan discloses the limitations as applied to Claim 28 above. Ramanujan further discloses that the maximum starvation register comprises an input to receive the predetermined number of valid bus agent IDs that will be passed over for processing (See Column 7 Lines 59-61).

22. In reference to Claim 32 Ramanujan discloses the limitations as applied to Claim 27 above. Ramanujan further discloses a fairness entry validation module to prohibit entry of the bus agent IDs onto the queue that do not comply with one or more predetermined queue entry rules (See Column 2 Lines 24-32).

23. In reference to Claim 33, Ramanujan discloses (a) a plurality of bus agents each capable of issuing commands (See Figure 1 Numbers 11-14); (b) an input/output (I/O) bus coupled to each of the bus agents to facilitate transfer of the commands (See Figure 1 Numbers 17-18 and 21-22); (c) a memory bus to facilitate transfer of the commands to and from a memory (See Figure 1 Numbers 33 and 35); and (d) an I/O bridge module to interface the I/O bus and the memory bus (See Figure 1 Number 15), wherein the I/O bridge module comprises: (1) an established-order arbiter for allocating

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bus ownership among a plurality of bus agents (See Column 1 Lines 18-38); (2) a processing fairness module, comprising: (i) a queue to store bus agent identifiers (IDs) corresponding to bus agents that issued commands which were subjected to a retry due to unavailable processing resources (See Column 1 Lines 43-47 and Column 2 Lines 33-37 and 49-55); (ii) a dynamically configurable-queue output throttle to adjust an availability of a valid bus agent ID at an output of the queue (See Column 2 Lines 33-48); and (3) an override module coupled to the established-order arbiter and the processing fairness module to grant command processing priority of the processing resources to either the bus agents corresponding to valid bus agent IDs or to the bus agents that have been granted bus ownership, depending on whether the valid bus agent ID at the output of the queue is available as determined by the queue output throttle (See Column 2 Lines 49-68).

24. In reference to Claim 34 Ramanujan discloses the limitations as applied to Claim 33 above. Ramanujan further discloses a plurality of the I/O buses, each coupled to a different plurality of the bus agents (See Figure 1 Numbers 19-20 and 23-24), and wherein the I/O bridge module comprises an established-order arbiter, a processing fairness module, and an override module for each of the plurality of the I/O buses (See Figure 2 Numbers 49a-49d).

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25. Claims 1, 8, 9, 10, 14, 17, 18, 19, 20, 23, 24, 25, 26, 27, 33, and 36 are rejected under 35 U.S.C. 102(a) as being anticipated by Borland AppServer Program Guide, Version 4.5 ("Borland").

26. In reference to Claim 1, Borland discloses allocating ownership of a bus to a plurality of agents based on a predetermined bus arbitration order (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 1); queuing agent identifiers of the agents that issued commands which were retried due to unavailable processing resources (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2 and Page 3-17, Bullet 2); and granting command processing priority of the processing resources to agents corresponding to the queued agent identifiers relative to other agents having ownership of the bus in an order in which the queued agent identifiers were queued relative to each other (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3).

27. In reference to Claim 8, Borland discloses the limitations as applied to Claim 1 above. Borland further discloses regulating the command processing priority between the agents corresponding to the queued agent identifiers and the other agents having ownership of the bus (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3).

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28. In reference to Claim 9, Borland discloses the limitations as applied to Claim 8 above. Borland further discloses selectively granting command processing priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3).

29. In reference to Claim 10, Borland discloses the limitations as applied to Claim 9 above. Borland further discloses that selectively granting command processing priority comprises disregarding the granting of command processing priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus in accordance with a configurable pattern (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-3).

30. In reference to Claim 14, Borland discloses allocating bus ownership to a plurality of agents based on a predetermined bus arbitration cycle (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 1); determining whether processing resources are available to process the commands issued by the agents that have been granted bus ownership (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2); initiating a retry for the commands that were not processed due to unavailable processing resources (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2 and Page 3-17, Bullet 2); queuing agent identifiers corresponding to each of the agents in which a retry

was initiated (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2 and Page 3-17, Bullet 2); receiving one or more controllable configuration parameters indicative of a desired processing ratio in which the commands issued according to the predetermined bus arbitration cycle are to be processed relative to the commands associated with the queued agent identifiers (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-3); and overriding the predetermined bus arbitration cycle and processing the commands associated with the agent identifiers that have been queued according to the desired processing ratio indicated by the controllable configuration parameters (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3).

31. In reference to Claim 17, Borland discloses the limitations as applied to Claim 14 above. Borland further discloses that the one or more controllable configuration parameters comprise a count representing a number of times in which the processing of the queued agent identifiers will be not be allowed to override the predetermined bus arbitration cycle (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-3).

32. In reference to Claim 18, Borland discloses the limitations as applied to Claim 14 above. Borland further discloses that overriding the predetermined bus arbitration cycle comprises allowing processing of the commands associated with the queued agent identifiers vis-à-vis the commands issued on the bus in accordance with the

predetermined bus arbitration cycle (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3).

33. In reference to Claim 19, Borland discloses the limitations as applied to Claim 14 above. Borland further discloses that initiating a retry for the commands that were not processed comprises issuing a retry response in response to determining that the processing resources are unavailable (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2 and Page 3-17, Bullet 2).

34. In reference to Claim 20, Borland discloses the limitations as applied to Claim 14 above. Borland further discloses imposing queue entry rules on the agent identifiers corresponding to the agents in which a retry was initiated, and wherein queuing the agent identifiers comprises queuing only those agent identifiers complying with the queue entry rules (See Page 3-17, Bullets 1-3).

35. In reference to Claim 23, Borland discloses allocating ownership of the bus to the plurality of agents based on a predetermined bus arbitration order (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 1); queuing agent identifiers identifying the agents that issued commands which were retried due to unavailable processing resources (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2 and Page 3-17, Bullet 2); granting command processing priority of the processing resources to agents corresponding to the queued

agent identifiers relative to other agents having ownership of the bus in accordance with the predetermined bus arbitration order (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3); and dynamically controlling a frequency in which the command processing is granted priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-3).

36. In reference to Claim 24, Borland discloses the limitations as applied to Claim 23 above. Borland further discloses that dynamically controlling a frequency comprises receiving one or more controllable configuration parameters, and regulating the frequency at which the queued agent identifiers are granted command processing priority in response to the controllable configuration parameters (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-3).

37. In reference to Claim 25, Borland discloses the limitations as applied to Claim 24 above. Borland further discloses that regulating the frequency at which the queued agent identifiers are granted command processing priority comprises enabling the queued agent identifiers to be output from a queue for processing after a predetermined number of valid queued agent identifiers have been passed over for processing (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-6).

38. In reference to Claim 26, Borland discloses the limitations as applied to Claim 25 above. Borland further discloses that enabling the queued agent identifiers to be output from a queue for processing comprises: comparing a predetermined pass over count to a current pass over count; incrementing the current pass over count each time a valid queued agent identifier has been passed over for processing; and enabling the queued agent identifiers to be output from the queue when the current pass over count reaches the predetermined pass over count (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 3-6).

39. In reference to Claim 27, Borland discloses (a) an established-order arbiter for allocating bus ownership among a plurality of bus agents (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 1); (b) a processing fairness module, comprising: (i) a queue to store bus agent identifiers (IDs) corresponding to bus agents that issued commands which were subjected to a retry due to unavailable processing resources (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2 and Page 3-17, Bullet 2); (ii) a dynamically configurable queue output throttle to adjust an availability of a valid bus agent ID at an output of the queue (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-3); (c) an override module coupled to the established-order arbiter and the processing fairness module to grant command processing priority of the processing resources to either the bus agents corresponding to valid bus agent IDs or

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to the bus agents that have been granted bus ownership, depending on whether the valid bus agent ID at the output of the queue is available as determined by the queue output throttle (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-6).

40. In reference to Claim 33, Borland discloses (1) an established-order arbiter for allocating bus ownership among a plurality of bus agents (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 1); (2) a processing fairness module, comprising: (i) a queue to store bus agent identifiers (IDs) corresponding to bus agents that issued commands which were subjected to a retry due to unavailable processing resources (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2 and Page 3-17, Bullet 2); (ii) a dynamically configurable-queue output throttle to adjust an availability of a valid bus agent ID at an output of the queue (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-3); and (3) an override module coupled to the established-order arbiter and the processing fairness module to grant command processing priority of the processing resources to either the bus agents corresponding to valid bus agent IDs or to the bus agents that have been granted bus ownership, depending on whether the valid bus agent ID at the output of the queue is available as determined by the queue output throttle (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-6).

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41. In reference to Claim 36, Borland discloses means for allocating ownership of the bus to the plurality of agents based on a predetermined bus arbitration order (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 1); means for queuing agent identifiers of the agents that issued commands which were retried due to unavailable processing resources (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 2 and Page 3-17, Bullet 2); means for granting command processing priority of the processing resources to agents corresponding to the queued agent identifiers relative to other agents having ownership of the bus in accordance with the predetermined bus arbitration order (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3); and means for controlling a frequency in which the command processing is granted priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus (See Page 3-16, 'How does the VisiTransact TM ensure completion?', Paragraph 3, Lines 2-6).

42. Claims 1, 8, 9, 10, 14, 18, 19, 21, 22, 23, 24, 25, 27, 33, and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by "Multithreaded Systems" by Kavi et al. ("Kavi").

43. In reference to Claim 1, Kavi discloses allocating ownership of a bus to a plurality of agents based on a predetermined bus arbitration order (See Page 24 Paragraph 2); queuing agent identifiers of the agents that issued commands which

were retried due to unavailable processing resources (See Page 26 Paragraph 2); and granting command processing priority of the processing resources to agents corresponding to the queued agent identifiers relative to other agents having ownership of the bus in an order in which the queued agent identifiers were queued relative to each other (See Page 26 Paragraph 2).

44. In reference to Claim 8, Kavi discloses the limitations as applied to Claim 1 above. Kavi further discloses regulating the command processing priority between the agents corresponding to the queued agent identifiers and the other agents having ownership of the bus (See Page 26 Paragraph 2).

45. In reference to Claim 9, Kavi discloses the limitations as applied to Claim 8 above. Kavi further discloses selectively granting command processing priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus (See Page 26 Paragraph 2 Lines 4-5).

46. In reference to Claim 10, Kavi discloses the limitations as applied to Claim 9 above. Kavi further discloses that selectively granting command processing priority comprises disregarding the granting of command processing priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus in accordance with a configurable pattern (See Page 26 Paragraph 2 Lines 4-5).

47. In reference to Claim 14, Kavi discloses allocating bus ownership to a plurality of agents based on a predetermined bus arbitration cycle (See Page 24 Paragraph 2); determining whether processing resources are available to process the commands issued by the agents that have been granted bus ownership (See Page 26 Paragraph 2 Lines 2-4); initiating a retry for the commands that were not processed due to unavailable processing resources (See Page 26 Paragraph 2); queuing agent identifiers corresponding to each of the agents in which a retry was initiated (See Page 26 Paragraph 2); receiving one or more controllable configuration parameters indicative of a desired processing ratio in which the commands issued according to the predetermined bus arbitration cycle are to be processed relative to the commands associated with the queued agent identifiers (See Page 26 Paragraph 2 Lines 4-5); and overriding the predetermined bus arbitration cycle and processing the commands associated with the agent identifiers that have been queued according to the desired processing ratio indicated by the controllable configuration parameters (See Page 26 Paragraph 2 Lines 4-5).

48. In reference to Claim 18, Kavi discloses the limitations as applied to Claim 14 above. Kavi further discloses that overriding the predetermined bus arbitration cycle comprises allowing processing of the commands associated with the queued agent identifiers vis-à-vis the commands issued on the bus in accordance with the predetermined bus arbitration cycle (See Page 26 Paragraph 2 Lines 4-5).

49. In reference to Claim 19, Kavi discloses the limitations as applied to Claim 14 above. Kavi further discloses that initiating a retry for the commands that were not processed comprises issuing a retry response in response to determining that the processing resources are unavailable (See Page 26 Paragraph 2).

50. In reference to Claim 21, Kavi discloses the limitations as applied to Claim 14 above. Kavi further discloses that the processing resources comprise at least one read thread (See Page 23 Paragraph 2 and Page 26 Paragraph 2 Lines 1-2).

51. In reference to Claim 22, Kavi discloses the limitations as applied to Claim 14 above. Kavi further discloses that the processing resources comprise at least one write thread (See Page 23 Paragraph 2 and Page 26 Paragraph 2 Lines 1-2).

52. In reference to Claim 23, Kavi discloses allocating ownership of the bus to the plurality of agents based on a predetermined bus arbitration order (See Page 24 Paragraph 2); queuing agent identifiers identifying the agents that issued commands which were retried due to unavailable processing resources (See Page 26 Paragraph 2); granting command processing priority of the processing resources to agents corresponding to the queued agent identifiers relative to other agents having ownership of the bus in accordance with the predetermined bus arbitration order (See Page 26 Paragraph 2); and dynamically controlling a frequency in which the command

processing is granted priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus (See Page 26 Paragraph 2 Lines 4-5).

53. In reference to Claim 24, Kavi discloses the limitations as applied to Claim 23 above. Kavi further discloses that dynamically controlling a frequency comprises receiving one or more controllable configuration parameters, and regulating the frequency at which the queued agent identifiers are granted command processing priority in response to the controllable configuration parameters (See Page 26 Paragraph 2 Lines 4-5).

54. In reference to Claim 25, Kavi discloses the limitations as applied to Claim 24 above. Kavi further discloses that regulating the frequency at which the queued agent identifiers are granted command processing priority comprises enabling the queued agent identifiers to be output from a queue for processing after a predetermined number of valid queued agent identifiers have been passed over for processing (See Page 26 Paragraph 2 Lines 4-5).

55. In reference to Claim 27, Kavi discloses (a) an established-order arbiter for allocating bus ownership among a plurality of bus agents (See Page 24 Paragraph 2); (b) a processing fairness module, comprising: (i) a queue to store bus agent identifiers (IDs) corresponding to bus agents that issued commands which were subjected to a

retry due to unavailable processing resources (See Page 26 Paragraph 2); (ii) a dynamically configurable queue output throttle to adjust an availability of a valid bus agent ID at an output of the queue (See Page 26 Paragraph 2 Lines 4-5); (c) an override module coupled to the established-order arbiter and the processing fairness module to grant command processing priority of the processing resources to either the bus agents corresponding to valid bus agent IDs or to the bus agents that have been granted bus ownership, depending on whether the valid bus agent ID at the output of the queue is available as determined by the queue output throttle (See Page 26 Paragraph 2).

56. In reference to Claim 33, Kavi discloses (a) a plurality of bus agents each capable of issuing commands (See Page 24 Figure 6 and Paragraph 2); (b) an input/output (I/O) bus coupled to each of the bus agents to facilitate transfer of the commands (See Page 24 Figure 6); (c) a memory bus to facilitate transfer of the commands to and from a memory (See Page 24 Figure 6 and Page 25 Paragraph 3); and (d) an I/O bridge module to interface the I/O bus and the memory bus (See Page 24 Figure 6), wherein the I/O bridge module comprises: (1) an established-order arbiter for allocating bus ownership among a plurality of bus agents (See Page 24 Paragraph 2); (2) a processing fairness module, comprising: (i) a queue to store bus agent identifiers (IDs) corresponding to bus agents that issued commands which were subjected to a retry due to unavailable processing resources (See Page 26 Paragraph 2); (ii) a dynamically configurable-queue output throttle to adjust an availability of a

valid bus agent ID at an output of the queue (See Page 26 Paragraph 2 Lines 4-5); and (3) an override module coupled to the established-order arbiter and the processing fairness module to grant command processing priority of the processing resources to either the bus agents corresponding to valid bus agent IDs or to the bus agents that have been granted bus ownership, depending on whether the valid bus agent ID at the output of the queue is available as determined by the queue output throttle (See Page 26 Paragraph 2).

57. In reference to Claim 36, Kavi discloses means for allocating ownership of the bus to the plurality of agents based on a predetermined bus arbitration order (See Page 24 Paragraph 2); means for queuing agent identifiers of the agents that issued commands which were retried due to unavailable processing resources (See Page 26 Paragraph 2); means for granting command processing priority of the processing resources to agents corresponding to the queued agent identifiers relative to other agents having ownership of the bus in accordance with the predetermined bus arbitration order (See Page 26 Paragraph 2); and means for controlling a frequency in which the command processing is granted priority to the agents corresponding to the queued agent identifiers relative to the other agents having ownership of the bus (See Page 26 Paragraph 2 Lines 4-5).

Claim Objections

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58. Claims 4 and 5 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 4 recites the limitation "queuing the identifiers in a first-in, first-out fashion", and Claim 5 recites the limitation "granting command processing priority to the agents corresponding to the queued agent identifiers in a first-in, first-out fashion". All queues input and output data in a first-in, first-out fashion, as evidenced by The Free On-Line Dictionary of Computing (See entry 'queue'). Thus, queuing the agent identifiers and granting command processing priority to the queued agent identifiers are both inherently done in a first-in, first-out fashion.

Response to Arguments

59. Applicant's arguments, see Pages 10-11, filed 21 July 2005, with respect to the rejection(s) of claim(s) 1-3 and 6-10 under 35 U.S.C. §102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, new grounds of rejection are made in view of Ramanujan, Borland, and Kavi.

Duty to Disclose

60. Applicant is reminded that each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in 37 CFR 1.56. Applicant is advised to submit any information material to patentability in accordance with 37 CFR 1.97 and 1.98.

Conclusion

61. The following art made of record and not relied upon is considered pertinent to Applicant's disclosure: US Patent Number 5,175,837 to Arnold et al.; US Patent Number 6,845,417 to Kauffman et al., and US Patent Number 6,141,715 to Porterfield.

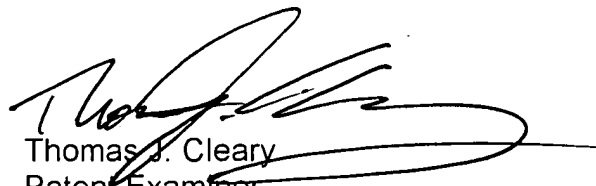
Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Thomas J. Cleary whose telephone number is 571-272-3624. The Examiner can normally be reached on Monday-Thursday (7-3:30), Alt. Fridays (7-2:30).

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rehana Perveen can be reached on 571-272-3676. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TJC



Thomas J. Cleary
Patent Examiner
Art Unit 2111



Khanh Dang
Primary Examiner